Practice: 412 - Grassed Waterway Scenario: #1 - <35 foot top width

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth, 55% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$3,192.77 Scenario Cost/Unit: \$3,192.77

Cost Details (by category		Price				
Component Name	ID	Component Description	Unit	(\$/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 150 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	369.5	\$1,344.98
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Excavation, common earth, large equipment, 50 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	369.5	\$569.03
Lime application		Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Fertilizer, ground application, dry bulk		Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Tillage, Light		Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Foregone Income				•	•	
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.5	\$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.5	\$218.88
Labor						
Supervisor or Manager		Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72
Materials						
Potassium, K2O		K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Nitrogen (N), Urea		Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80

Phosphorus, P2O5		Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass		Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Mobilization						
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28

Practice: 412 - Grassed Waterway Scenario: #2 - 35-55 foot topwidth

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$3,368.89 Scenario Cost/Unit: \$3,368.89

Cost Details (by category): **Price Component Name** Unit **Quantity Cost Component Description** (\$/unit) Equipment/Installation Excavation, common earth, 1222 Bulk excavation of common earth including sand and Cubic \$1.54 403.5 \$621.39 large equipment, 50 ft gravel with dozer >100 HP with average push distance of Yard 50 feet. Includes equipment and labor. \$3.64 403.5 1223 Bulk excavation of common earth including sand and Cubic \$1,468.74 Excavation, common earth, gravel with dozer >100 HP with average push distance of Yard large equipment, 150 ft 150 feet. Includes equipment and labor. 1 \$6.52 Fertilizer, ground application, 950 Dry bulk fertilizer application performed by ground \$6.52 Acre dry bulk equipment. Includes equipment, power unit and labor costs. Lime application 953 Lime application performed by ground equipment. Acre \$9.73 1 \$9.73 Includes equipment, power unit and labor costs. Seeding Operation, No 960 No Till drill or grass drill for seeding. Includes equipment, \$20.46 1 \$20.46 Acre Till/Grass Drill power unit and labor costs. Tillage, Light 945 Includes light disking (tandem) or field cultivator. Includes \$10.67 1 \$10.67 Acre equipment, power unit and labor costs. 1 \$8.12 Cultipacking 1100 Includes equipment, power unit and labor costs. Acre \$8.12 Foregone Income FI, Soybeans Dryland 1961 Dryland Soybeans is Primary Crop \$430.43 0.5 \$215.22 Acre FI, Corn Dryland 1959 Dryland Corn is Primary Crop Acre \$437.76 0.5 \$218.88 Labor \$36.72 \$36.72 Supervisor or Manager 234 Labor involving supervision or management activities. Hour 1 Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. Materials Three Species Mix, Cool 2315 Cool season, introduced grass mix. Includes material and \$46.58 1 \$46.58 Acre Season, Introduced Perennial shipping only. Grass

Phosphorus, P2O5		Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Potassium, K2O		K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Nitrogen (N), Urea		Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Mobilization						
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28

Practice: 412 - Grassed Waterway Scenario: #3 - >55 foot topwidth

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$4,065.60 Scenario Cost/Unit: \$4,065.60

Cost Details (by category): **Price** Unit **Quantity Cost Component Name Component Description** (\$/unit) Equipment/Installation Excavation, common earth, 1223 Bulk excavation of common earth including sand and Cubic \$3.64 538 \$1,958.32 large equipment, 150 ft gravel with dozer >100 HP with average push distance of Yard 150 feet. Includes equipment and labor. \$8.12 Cultipacking 1100 Includes equipment, power unit and labor costs. Acre \$8.12 1 Fertilizer, ground application, 950 Dry bulk fertilizer application performed by ground Acre \$6.52 1 \$6.52 dry bulk equipment. Includes equipment, power unit and labor costs. 1 \$20.46 Seeding Operation, No 960 No Till drill or grass drill for seeding. Includes equipment, Acre \$20.46 Till/Grass Drill power unit and labor costs. \$9.73 1 \$9.73 Lime application 953 Lime application performed by ground equipment. Acre Includes equipment, power unit and labor costs. Excavation, common earth, 1222 Bulk excavation of common earth including sand and Cubic \$1.54 538 \$828.52 large equipment, 50 ft gravel with dozer >100 HP with average push distance of Yard 50 feet. Includes equipment and labor. 1 \$10.67 Tillage, Light 945 Includes light disking (tandem) or field cultivator. Includes \$10.67 equipment, power unit and labor costs. Foregone Income FI, Soybeans Dryland 1961 Dryland Soybeans is Primary Crop \$430.43 0.5 \$215.22 Acre FI, Corn Dryland 1959 Dryland Corn is Primary Crop Acre \$437.76 0.5 \$218.88 Labor \$36.72 \$36.72 Supervisor or Manager 234 Labor involving supervision or management activities. Hour 1 Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. Materials Potassium, K2O 74 K2O supplied by Muriate Of Potash. Price is not per pound | Pound \$0.50 90 \$45.00 of total product applied, no conversion is needed. Phosphorus, P2O5 73 Price per pound of P2O5 supplied by Superphosphate. Pound \$0.65 90 \$58.50 Price is not per pound of total product applied, no conversion is needed.

Materials						
Three Species Mix, Cool Season, Introduced Perennial Grass		Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Nitrogen (N), Urea		Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Mobilization	•		•			
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length nermits	Each	\$494.28	1	\$494.28

Scenario: #4 - <35 foot topwidth with checks

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre
Scenario Typical Size: 1

70

Scenario Cost: \$4,171.88 Scenario Cost/Unit: \$4,171.88

Cost Details (by category	-	Community Boundaries		Price	0	01
Component Name	ID	Component Description	Unit	(\$/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 150 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	369.5	\$1,344.98
Excavation, common earth, large equipment, 50 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	369.5	\$569.03
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Seeding Operation, No Till/Grass Drill		No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Lime application		Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Tillage, Light		Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Fertilizer, ground application, dry bulk		Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.5	\$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.5	\$218.88
Labor						
Supervisor or Manager		Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72

Phosphorus, P2O5		Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Potassium, K2O		K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass		Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Rock Riprap, Placed with geotextile		Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$64.83	14	\$907.62
Nitrogen (N), Urea		Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Mobilization						
Mobilization, very small equipment		Equipment that is small enough to be transported by a pick- up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$71.49	1	\$71.49
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28

Scenario: #5 - 35-55 foot topwidth with checks

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gully which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre
Scenario Typical Size: 1

Scenario Cost: \$4,477.66 Scenario Cost/Unit: \$4,477.66

Cost Details (by category)				Price		
Component Name	ID	Component Description	Unit	(\$/unit)	Quantity	Cost
Equipment/Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	403.5	\$621.39
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Excavation, common earth, large equipment, 150 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	403.5	\$1,468.74
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.5	\$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.5	\$218.88
Labor				'		•
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72

Phosphorus, P2O5		Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Three Species Mix, Cool Season, Introduced Perennial Grass		Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Potassium, K2O		K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Nitrogen (N), Urea		Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Rock Riprap, Placed with geotextile		Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$64.83	16	\$1,037.28
Mobilization	•			•	•	
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28
Mobilization, very small equipment		Equipment that is small enough to be transported by a pick- up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$71.49	1	\$71.49

Scenario: #6 - >55 foot topwidth with checks

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre
Scenario Typical Size: 1

Scenario Cost: \$5,109.54 Scenario Cost/Unit: \$5,109.54

Cost Details (by category		Common ant Description	11	Price	O	Coot
Component Name	ID	Component Description	Unit	(\$/unit)	Quantity	Cost
Equipment/Installation	_					
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Excavation, common earth, large equipment, 50 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	538	\$828.52
Excavation, common earth, large equipment, 150 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	538	\$1,958.32
Tillage, Light		Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Fertilizer, ground application, dry bulk		Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	0.5	\$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	0.5	\$218.88
Labor						
Supervisor or Manager		Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72

Three Species Mix, Cool Season, Introduced Perennial Grass		Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Rock Riprap, Placed with geotextile		Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$64.83	15	\$972.45
Nitrogen (N), Urea		Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Phosphorus, P2O5		Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Potassium, K2O		K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Mobilization	•				•	
Mobilization, very small equipment		Equipment that is small enough to be transported by a pick- up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$71.49	1	\$71.49
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28

Scenario: #7 - <35 foot top width, crop season construction

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth, 55% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$4,060.96 Scenario Cost/Unit: \$4,060.96

Cost Details (by category): Price **Component Name Component Description** Unit **Quantity Cost** (\$/unit) Equipment/Installation Lime application 953 Lime application performed by ground equipment. Acre \$9.73 1 \$9.73 Includes equipment, power unit and labor costs. 960 No Till drill or grass drill for seeding. Includes equipment, 1 \$20.46 Seeding Operation, No \$20.46 Acre power unit and labor costs. Till/Grass Drill 1223 Bulk excavation of common earth including sand and \$3.64 369.5 \$1,344.98 Excavation, common earth, Cubic gravel with dozer >100 HP with average push distance of large equipment, 150 ft Yard 150 feet. Includes equipment and labor. \$10.67 945 Includes light disking (tandem) or field cultivator. Includes \$10.67 Tillage, Light Acre equipment, power unit and labor costs. Cultipacking 1100 Includes equipment, power unit and labor costs. Acre \$8.12 \$8.12 \$6.52 Fertilizer, ground application, 950 Dry bulk fertilizer application performed by ground Acre \$6.52 dry bulk equipment. Includes equipment, power unit and labor costs. \$1.54 \$569.03 Excavation, common earth, 1222 Bulk excavation of common earth including sand and Cubic 369.5 large equipment, 50 ft gravel with dozer >100 HP with average push distance of Yard 50 feet. Includes equipment and labor. Foregone Income FI, Corn Dryland 1959 Dryland Corn is Primary Crop Acre \$437.76 1.5 \$656.64 FI, Soybeans Dryland 1961 Dryland Soybeans is Primary Crop Acre \$430.43 1.5 \$645.65 Labor Supervisor or Manager 234 Labor involving supervision or management activities. Hour \$36.72 1 \$36.72 Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. Materials 74 K2O supplied by Muriate Of Potash. Price is not per pound | Pound \$0.50 90 \$45.00 Potassium, K2O of total product applied, no conversion is needed.

Phosphorus, P2O5	Price is r	r pound of P2O5 supplied by Superphosphate. not per pound of total product applied, no on is needed.	Pound	\$0.65	90	\$58.50
Lime, ENM	75 Fertilizei	r: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass	2315 Cool sea shipping	son, introduced grass mix. Includes material and only.	Acre	\$46.58	1	\$46.58
Nitrogen (N), Urea		r pound of N supplied by Urea. Price is not per f total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Mobilization						
Mobilization, large equipment	' '	ent >150HP or typical weights greater than 30,000 or loads requiring over width or over length	Each	\$494.28	1	\$494.28

Scenario: #8 - <35 foot topwidth with checks, crop season construction

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre
Scenario Typical Size: 1

Scenario Cost: \$5,040.07 Scenario Cost/Unit: \$5,040.07

Cost Details (by category Component Name	•	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation				(3/uiiit)		
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	369.5	\$569.03
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	369.5	\$1,344.98
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	1.5	\$656.64
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	1.5	\$645.65
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72
Materials			•		•	•
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00

Phosphorus, P2O5	73 Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Nitrogen (N), Urea	71 Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Rock Riprap, Placed with geotextile	44 Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$64.83	14	\$907.62
Three Species Mix, Cool Season, Introduced Perennial Grass	2315 Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Lime, ENM	75 Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Mobilization					
Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28
Mobilization, very small equipment	Equipment that is small enough to be transported by a pic up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.		\$71.49	1	\$71.49

Scenario: #9 - 35-55 foot topwidth, crop season construction

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$4,237.08 Scenario Cost/Unit: \$4,237.08

Cost Details (by category Component Name		Component Description	Unit	Price	Quantity	Cost
Equipment/Installation	טו	Component Description	Onit	(\$/unit)	Quantity	Cost
Seeding Operation, No Till/Grass Drill		No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Excavation, common earth, large equipment, 150 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	403.5	\$1,468.74
Tillage, Light		Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Fertilizer, ground application, dry bulk		Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Lime application		Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Excavation, common earth, large equipment, 50 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	403.5	\$621.39
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	1.5	\$656.64
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	1.5	\$645.65
Labor						
Supervisor or Manager		Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass		Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58

Potassium, K2O		K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Phosphorus, P2O5		Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Nitrogen (N), Urea		Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Mobilization	•				•	•
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28

Scenario: #10 - 35-55 foot topwidth with checks, crop season construction

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gully which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$5,345.85 Scenario Cost/Unit: \$5,345.85

Cost Details (by category):			Price		
Component Name	ID	Component Description	Unit	(\$/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Light		Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Excavation, common earth, large equipment, 150 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	403.5	\$1,468.74
Excavation, common earth, large equipment, 50 ft		Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	403.5	\$621.39
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Seeding Operation, No Till/Grass Drill		No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Fertilizer, ground application, dry bulk		Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Lime application		Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	1.5	\$645.65
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	1.5	\$656.64
Labor						
Supervisor or Manager		Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72

Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Phosphorus, P2O5		Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$64.83	16	\$1,037.28
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick- up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$71.49	1	\$71.49

Scenario: #11 - >55 foot topwidth, crop season construction

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: \$4,933.79 Scenario Cost/Unit: \$4,933.79

Cost Details (by category Component Name	'): ID	Component Description	Unit	Price	Quantity	Cost
Equipment/Installation	טו	Component Description	Ollit	(\$/unit)	Quantity	Cost
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	538	\$828.52
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	538	\$1,958.32
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Foregone Income	•				•	•
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	1.5	\$645.65
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	1.5	\$656.64
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50

Potassium, K2O		K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass		Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Mobilization						
Mobilization, large equipment		Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28

Scenario: #12 - >55 foot topwidth with checks, crop season construction

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre
Scenario Typical Size: 1

Scenario Cost: \$5,977.73 Scenario Cost/Unit: \$5,977.73

Cost Details (by category) Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation				(3) anit		
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	\$8.12	1	\$8.12
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.54	538	\$828.52
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$20.46	1	\$20.46
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$9.73	1	\$9.73
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	\$6.52	1	\$6.52
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$10.67	1	\$10.67
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	\$3.64	538	\$1,958.32
Foregone Income	•		·		·	
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$437.76	1.5	\$656.64
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$430.43	1.5	\$645.65
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$36.72	1	\$36.72

Three Species Mix, Cool Season, Introduced Perennial Grass	2315 Cool season, introduced grass mix. Includes material and shipping only.	Acre	\$46.58	1	\$46.58
Lime, ENM	75 Fertilizer: Limestone Spread on field.	Ton	\$26.14	2	\$52.28
Potassium, K2O	74 K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.50	90	\$45.00
Phosphorus, P2O5	73 Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.65	90	\$58.50
Nitrogen (N), Urea	71 Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	\$0.62	90	\$55.80
Rock Riprap, Placed with geotextile	44 Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$64.83	15	\$972.45
Mobilization		•			·
Mobilization, very small equipment	Equipment that is small enough to be transported by a pick up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	- Each	\$71.49	1	\$71.49
Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$494.28	1	\$494.28